CLAIMS

1. A differentiated cell population as part of a system for generating glial cells, wherein at least ~80% of cells in the differentiated cell population are oligodendrocyte precursors having the following characteristics:
    - they are progeny of primate pluripotent stem (pPS) cells;
    - they stain with antibody specific for NG2 proteoglycan; and
    - they are negative for the neuronal marker NeuN;

   and wherein the system further comprises the line of pPS cells from which the differentiated cells were produced.

2. A system for generating glial cells, comprising a line of undifferentiated pPS cells; and a differentiated cell population in which at least 80% of the cells have the following characteristics:
    - they are progeny of primate pluripotent stem (pPS) cells;
    - they stain with antibody specific for NG2 proteoglycan; and
    - they are negative for the neuronal marker NeuN.

3. A differentiated cell population according to either preceding claim, wherein at least 80% of the cells also express A2B5.

4. The differentiated cell population according to any preceding claim, wherein at least 80% of the cells also express platelet-derived growth factor receptor-α (PDGFRα).

5. The differentiated cell population according to any preceding claim, wherein at least 20% of the cells show a bipolar morphology characteristic of oligodendrocyte precursors.

6. The differentiated cell population according to any preceding claim, whereupon culturing for 3 days on poly-L-lysine and laminin in the absence of mitogens, at least 10% of the cells have complex processes characteristic of mature oligodendrocytes.

7. The differentiated cell population according to any preceding claim, wherein implantation of the population into the spinal cord of a shiverer mutant mouse causes deposition of compact myelin around neuronal axons.

8. The differentiated cell population according to any preceding claim, wherein implantation of the population in or around the spinal cord in a contusion-injured rat causes improvement in overground locomotion.

9. The differentiated cell population according to any preceding claim, obtained by a process in which the undifferentiated pPS cells are cultured in a medium containing a mitogen and at least two oligodendrocyte differentiation factors.

10. The differentiated cell population according to any preceding claim, obtained by a process in which the undifferentiated pPS cells are cultured in suspension so as to form cell aggregates in the presence of basic fibroblast growth factor (FGF), triiodothyronine (T3), and retinoic acid.

11. The differentiated cell population according to any preceding claim, obtained by a process in which glial cells are separated from non-glial cells.

12. The differentiated cell population according to any preceding claim, obtained by a process in which the cells are cultured in a medium comprising thyroid hormone and selenium.

13. The differentiated cell population according to any preceding claim, obtained by a process in which the cells are caused to differentiate further by culturing in the absence of mitogens.

14. The differentiated cell population according to any preceding claim, wherein the pPS cells are human embryonic stem (hES) cells.

15. A method for producing glial cells from undifferentiated primate pluripotent stem (pPS) cells, comprising culturing the undifferentiated pPS cells in a medium containing a mitogen and at least two oligodendrocyte differentiation factors.

16. The method of claim 15, comprising culturing undifferentiated pPS cells in suspension culture so as to form cell aggregates in the presence of a growth factor, a ligand for a thyroid hormone receptor, and a ligand for a retinoic acid receptor.

17. The method of claim 16, wherein the growth factor is basic fibroblast growth factor.

18. The method of claims 15-17, comprising culturing the cells in a medium comprising the thyroid hormone T3 and selenium.

19. The method of any of claims 15-18, wherein the cell aggregates form yellow spheres in the suspension culture.

20. The method of claims 15-19, further comprising separating glial cells from non-glial cells.

21. The method of claim 15-20, wherein the separating is performed by plating the cells onto a solid surface, and harvesting cells that adhere to the surface.

22. The method of claims 15-21, wherein glial cells are caused to differentiate further by culturing in the absence of mitogens.

23. The method of claims 15-22, wherein the cells obtained have the characteristic of differentiated cells according to any of claims 1-14.

24. A method of screening a compound for its effect on glial cells, comprising:

a) obtaining a population of differentiated cells according to any of claims 1-14;

b) combining the cell population with the compound;

c) determining any change to cells in the population or their activity that results from being combined with the compound; and

d) correlating the change with the effect of the compound on glial cells.

25. A method of myelinating an axon, comprising combining a population of differentiated cells according to any of claims 1-14 with a neuronal cell from which the axon extends.

26. A pharmaceutical composition, comprising the differentiated cell population according to any of claims 1-14.

27. Use of a differentiated cell population according to any of claims 1-14, in the manufacture of a medicament for improving function of the central nervous system.

28. Use of a differentiated cell population according to any of claims 1-14, in the manufacture of a medicament for the treatment of spinal cord injury.

29. Use of a differentiated cell population according to any of claims 1-14 to improve function of the central nervous system.

30. Use of a differentiated cell population according to any of claims 1-14 to treat spinal cord injury.

31. A method of improving CNS function in a subject, comprising administering to the subject a differentiated cell population according to any of claims 1-14.

32. A method of improving spinal cord function in a subject, comprising administering into the spinal cord a differentiated cell population according to any of claims 1-14.

33. A composition according to any one of claims 1-14 and 26, substantially as hereinbefore described with reference to any one of the Examples.

34. A method or use according to any one of claims 15-25 and 27-30, substantially as hereinbefore described with reference to any one of the Examples.